WO 2004/113769 PCT/US2004/019495

THE INVENTION CLAIMED IS:

1. An apparatus for restricting axial leakage flow through the clearance between a rotating shaft and a seal stator and providing necessary damping to improve rotor stability comprising:

said shaft having a stepped surface, said surface having a plurality of sections of a first diameter and a plurality of sections of a second lesser diameter being interleaved and adjacent;

said seal stator having a plurality of damper sections and a plurality of labyrinth sections, said sections of damping and labyrinth being interleaved and adjacent;

said damper sections of the seal stator adjacent the shaft section of first diameter to provide damping; and

said labyrinth sections of the seal stator adjacent the shaft of second diameter to form a tortuous flow path for reducing seal leakage.

- 2. The seal stator according to claim 1, wherein the damper sections are slotted pocket segments.
- 3. The seal stator according to claim 1, wherein the damper sections are honeycomb segments.
- 4. The seal stator according to claim 1, wherein the damper sections are hole pattern segments.